

MEMORANDUM

To: Aaron Lambert, U.S. Environmental Protection Agency
Date: January 25, 2013

From: Ryan Barth, Anchor QEA
Project: 010128-01.04

For: John Gross, Jorgensen Forge Corporation
Will Ernst, The Boeing Company

Cc: Maureen Sanchez, Ecology
Holly Arrigoni, EPA
Becky Chu, EPA
David Templeton, Anchor QEA
Tom Colligan, Floyd|Snider
Amy Essig Desai, Farallon Consulting

Re: Results of Additional Soil Geoprobe Vertical Characterization at the Jorgensen Forge Outfall Site

This memorandum summarizes the results of the additional Geoprobe soil characterization conducted at the Jorgensen Forge Outfall Site on December 6, 2012, by the Jorgensen Forge Corporation (Jorgensen Forge) and The Boeing Company (Boeing) to further characterize the vertical extents of polychlorinated biphenyls (PCBs) in soils and the use of this information in the removal action design.

BACKGROUND

As detailed in the Attachment 1 memorandum *Work Plan Addendum for Additional Vertical Polychlorinated Biphenyls Characterization in Soil – Jorgensen Forge Outfall Site* (Work Plan Addendum; Anchor QEA 2012), Boeing and Jorgensen Forge are currently working with the U.S. Environmental Protection Agency (EPA) to develop a Second Modification to the 2011 EPA Administrative Order on Consent (AOC; Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2011-0017). The Second Modification to the AOC will require Jorgensen Forge and Boeing to remove the corrugated metal sections of the 24-inch and Boeing 12-inch property line storm pipes (herein referred to as the Pipes) and underlying soils containing total PCBs above 1

milligram per kilogram (mg/kg), which are generally confined within the upper 32 feet of soil in the northwestern corner of the Jorgensen Forge property and the southwestern corner of Boeing Plant 2 property (herein referred to as the Site; Figure 1).

During removal action discussions with EPA and the Washington State Department of Ecology (Ecology), the agencies conveyed that all existing Geoprobe locations within the Site would need to be vertically bounded below 1 mg/kg total PCBs at depth to eliminate post-construction soil PCB confirmation analysis. Although the existing lateral data density is very high (i.e., Geoprobe borings are spaced approximately 2 to 10 feet apart throughout the Site), there were three (T1B3, JF-DGP3, and T2B4; Figure 2) out of a total of 17 stations where the deepest depth interval sampled contained total PCBs greater than 1 mg/kg. Jorgensen Forge and Boeing voluntarily developed the Work Plan Addendum (Attachment 1) in coordination with EPA and Ecology to complete three additional Geoprobe borings co-located at these three stations to bound the vertical extents of soil exceeding 1 mg/kg total PCBs. As a secondary objective, metals analyses were performed on samples to help plan the management of soils excavated during the removal action.

METHODS AND RESULTS

Anchor QEA and Floyd|Snider managed the collection of the three Geoprobe soil borings by Cascade Drilling on December 6, 2012. The borings were collected in accordance with the methods and procedures summarized in EPA and Ecology-reviewed Attachment 1. The boring logs are provided in Attachment 2. A summary of the soil sampling depth intervals and analyses performed at each station are shown on Table 1. In summary, PCB analyses were conducted in approximately 2-foot intervals from 20 to 37 feet below ground surface (bgs) at station T1B3, from 35 to 42 feet bgs at station JF-DGP3, and 25 to 42 feet bgs at station T2B4. To assist with waste characterization decisions for soils excavated as part of the removal action, toxicity characteristic leaching procedure (TCLP) metals analysis was conducted using an 18 to 20 feet bgs sample at station T1B3, and 15 to 20 feet and 23 to 24.5 feet bgs samples at station JF-DGP3. These locations and depths intervals were chosen because they exhibited the highest metals concentrations identified at the Site during previous soil characterizations.

The total PCB analytical results are depicted on Figure 2, (see the blue-shaded cells) along with all prior data, and are summarized in Table 2. PCBs were not detected in any of the samples at any depth collected at stations T1B3 or JF-DGP3. Low-level total PCBs ranging

from 0.09 to 0.56 mg/kg were identified from 25 to 39 feet bgs at station T2B4 and the deepest collected depth interval at this station (40 to 42 feet bgs) contained 2.1 mg/kg, which exceeded the target 1 mg/kg total PCB sampling objective. All samples collected at the three stations were comprised of native soil that showed no evidence of sheen or elevated photo-ionization detector concentrations, no silt lenses, and mostly grey, fine sands.

The metals TCLP analytical results are summarized in Table 3. All of the results were below the maximum concentration of contaminants for toxicity characteristics that would designate the soil as hazardous waste (Table 1 of 40 Code of Federal Regulations 261.24).

The data validation report for the soil and TCLP analyses is provided as Attachment 3. No data quality issues were identified.

CONCLUSIONS

During three separate investigations (Phase 1, Phase 2 and this Work Plan Addendum), Jorgensen Forge and Boeing advanced a total of 17 Geoprobe soil borings extending from 15 to 42 feet bgs in an approximately 80-foot-by-40-foot area within and immediately surrounding the Site. A total of 130 soil samples were analyzed for total PCBs, and the resulting data adequately characterize the lateral and vertical extents of PCBs for the purposes of removal action design. As shown on Figure 2, the vertical extents of total PCBs exceeding 1 mg/kg were identified in all sampling stations to be generally 32 feet or less except for the deepest sample at station T2B4, located approximately 40 feet beneath the 24-inch property line pipe and approximately 20 feet below the native soil contact.

At T2B4, elevated total PCB concentrations were identified during the Phase 1 investigation in the 18- to 20-foot (274 mg/kg) and 23- to 25-foot (72 mg/kg) depth intervals. The total PCB concentrations collected during the Work Plan Addendum investigation decreased to less than 1 mg/kg in all samples collected from 25 to 39 feet bgs but slightly increased to 2.1 mg/kg in the final 40 to 42 feet bgs bottom sampling interval. Review of the T2B4 boring log (Attachment 2) indicated that the soil profile at T2B4 is grey silty-sand from approximately 20 to 30 feet bgs and grey sand from 30 to 49 feet bgs, with native soil occurring at approximately 20 feet bgs. There were no visual or olfactory indications suggesting a reason for the anomalous increase in PCB concentration in the bottom interval. There were also no detectable PCB concentrations in the 40 to 42 feet bgs depth interval (also native soil) at station JF-DGP3, approximately 12 feet east of T2B4. Based on this information, it is

concluded that the slight increase in low-level concentrations at depth is confined to T2B4 and either extends to 42 feet bgs or is consistent with contamination being advanced during Geoprobe penetration through significantly elevated PCB concentrations (i.e., drag down of 72 mg/kg total PCBs at 23 to 25 feet bgs).

Soil cleanup at an industrial site is regulated under the Modeled Toxics Control Act (MTCA) Section 173-340-745. The Method A total PCB soil cleanup level for industrial properties is 10 mg/kg with a standard point of compliance that extends from the ground surface to 15 feet bgs. As communicated to EPA and Ecology, Jorgensen Forge and Boeing are proposing a conservative removal action that will remove soils within the Site that exceed the MTCA Method A total PCB soil cleanup level of 1 mg/kg total for unrestricted land use. Sufficient data have been collected to develop a removal design to this cleanup level. Soils with PCB concentrations below this conservative cleanup level will also be removed to depths deeper than the 15 foot bgs standard point of compliance, including to depths of 32 feet bgs in some areas. The average soil concentration below the proposed removal elevations will be well below 1 mg/kg total PCBs, with only a single, deep sample exceeding the MTCA Method A unrestricted land use cleanup level, as noted above. Any contamination remaining in soils at such depths presents no risk given the lack of a viable pathway to receptors of concern. Potential remaining contamination will be isolated at approximately three times deeper than the MTCA standard point of compliance, with 32 feet of overlying clean backfill, and is technically impractical to remove.

TABLES

Table 1
Additional Soil Geoprobe Vertical Characterization PCB Results

Task	Preliminary Screening Levels	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization
Location ID		T1B3	T1B3	T1B3	T1B3	T1B3	T1B3	T1B3	JFDGP3	JFDGP3
Sample ID		T1B3-20-22- 121206	T1B3-22-24- 121206	T1B3-25-27- 121206	T1B3-30-32- 121206	T1B3-32-34- 121206	T1B3-35-37- 121206	T1B3-37-39- 121206	JFDGP3-32-34- 121206	JFDGP3-35-37- 121206
Sample Date		12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012
PCB Aroclors (mg/kg dw)										
Aroclor 1016	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1242	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1248	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1254	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1260	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1221	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1232	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1262	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Aroclor 1268	NA	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U
Total PCB Aroclor (U=0)	1	0.031 U	0.032 U	0.032 U	0.032 U	0.031 U	0.032 U	0.033 U	0.032 U	0.032 U

Table 1
Additional Soil Geoprobe Vertical Characterization PCB Results

Task	Preliminary Screening Levels	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization
Location ID		JFDGP3	JFDGP3	JFDGP3	T2B4	T2B4	T2B4	T2B4	T2B4	T2B4
Sample ID		JFDGP3-35-37- 121206	JFDGP3-37-39- 121206	JFDGP3-40-42- 121206	T2B4-25-27- 121206	T2B4-27-28.3- 121206	T2B4-30-32- 121206	T2B4-32-33.3- 121206	T2B4-35-37- 121206	T2B4-37-39- 121206
Sample Date		12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012	12/6/2012
PCB Aroclors (mg/kg dw)										
Aroclor 1016	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1242	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1248	NA	0.031 U	0.032 U	0.031 U	0.039 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1254	NA	0.031 U	0.032 U	0.031 U	0.18	0.40	0.52	0.39	0.56	0.09
Aroclor 1260	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1221	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1232	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1262	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Aroclor 1268	NA	0.031 U	0.032 U	0.031 U	0.031 U	0.130 U	0.120 U	0.120 U	0.120 U	0.033 U
Total PCB Aroclor (U=0)	1	0.031 U	0.032 U	0.031 U	0.18	0.40	0.52	0.39	0.56	0.09

Table 1
Additional Soil Geoprobe Vertical Characterization PCB Results

Task	Preliminary Screening Levels	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization
Location ID		T2B4	T2B4
Sample ID		T2B4-40-42- 121206	T2B4-40-42- 121206
Sample Date		12/6/2012	12/6/2012
PCB Aroclors (mg/kg dw)			
Aroclor 1016	NA	0.630 U	0.31 U
Aroclor 1242	NA	0.630 U	0.31 U
Aroclor 1248	NA	0.630 U	0.31 U
Aroclor 1254	NA	2.40	2.1
Aroclor 1260	NA	0.630 U	0.31 U
Aroclor 1221	NA	0.630 U	0.31 U
Aroclor 1232	NA	0.630 U	0.31 U
Aroclor 1262	NA	0.630 U	0.31 U
Aroclor 1268	NA	0.630 U	0.31 U
Total PCB Aroclor (U=0)	1	2.40	2.1

Notes:
ID = identification
mg/kg dw = milligrams per kilogram dissolved water
NA = not applicable
PCB = polychlorinated biphenyls
U = analyte was not detected above reporting limit

Table 2
Additional Soil Geoprobe Vertical Characterization Metals TCLP Results

Task	TCLP Maximum Concentrations of Contaminants Screening Levels	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization	Jorgensen Forge Outfall Site Vertical Charaterization
Location ID		T1B3	T2B4	T2B4
Sample ID		T1B3-18-20- 121206	T2B4-15-20- 121206	T2B4-23-24.5- 121206
Sample Date		12/6/2012	12/6/2012	12/6/2012
TCLP Metals (mg/L)				
Arsenic	5	0.2 U	0.2 U	0.2 U
Barium	100	0.06	0.1	0.06
Cadmium	1	0.01 U	0.04	0.01 U
Chromium	5	0.02 U	0.02 U	0.02 U
Lead	5	0.1	0.4	0.1 U
Mercury	0.2	0.0001 U	0.0001 U	0.0001 U
Selenium	1	0.2 U	0.2 U	0.2 U
Silver	5	0.02 U	0.02 U	0.02 U

Notes:

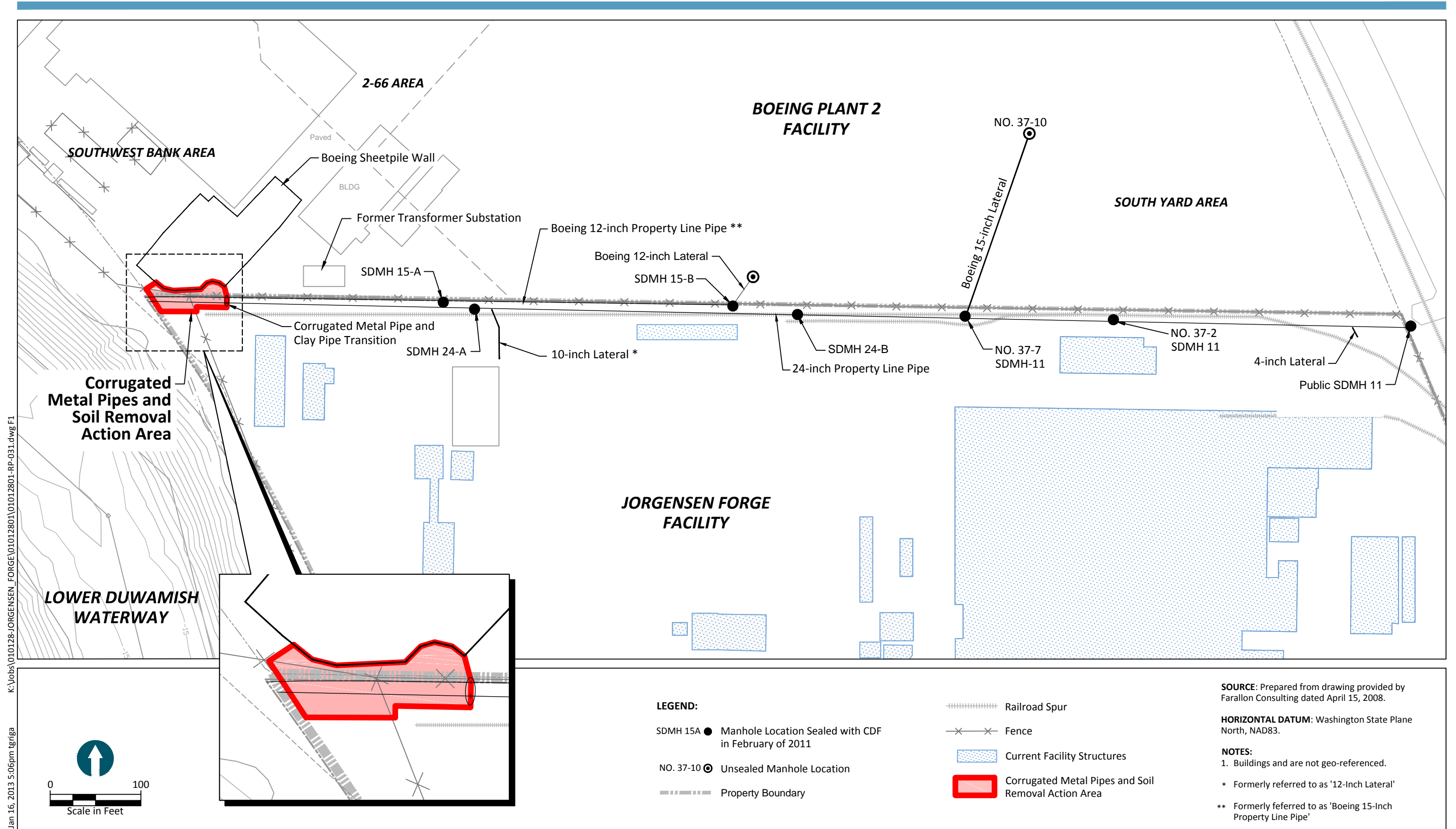
ID = identification

mg/L = milligrams per liter

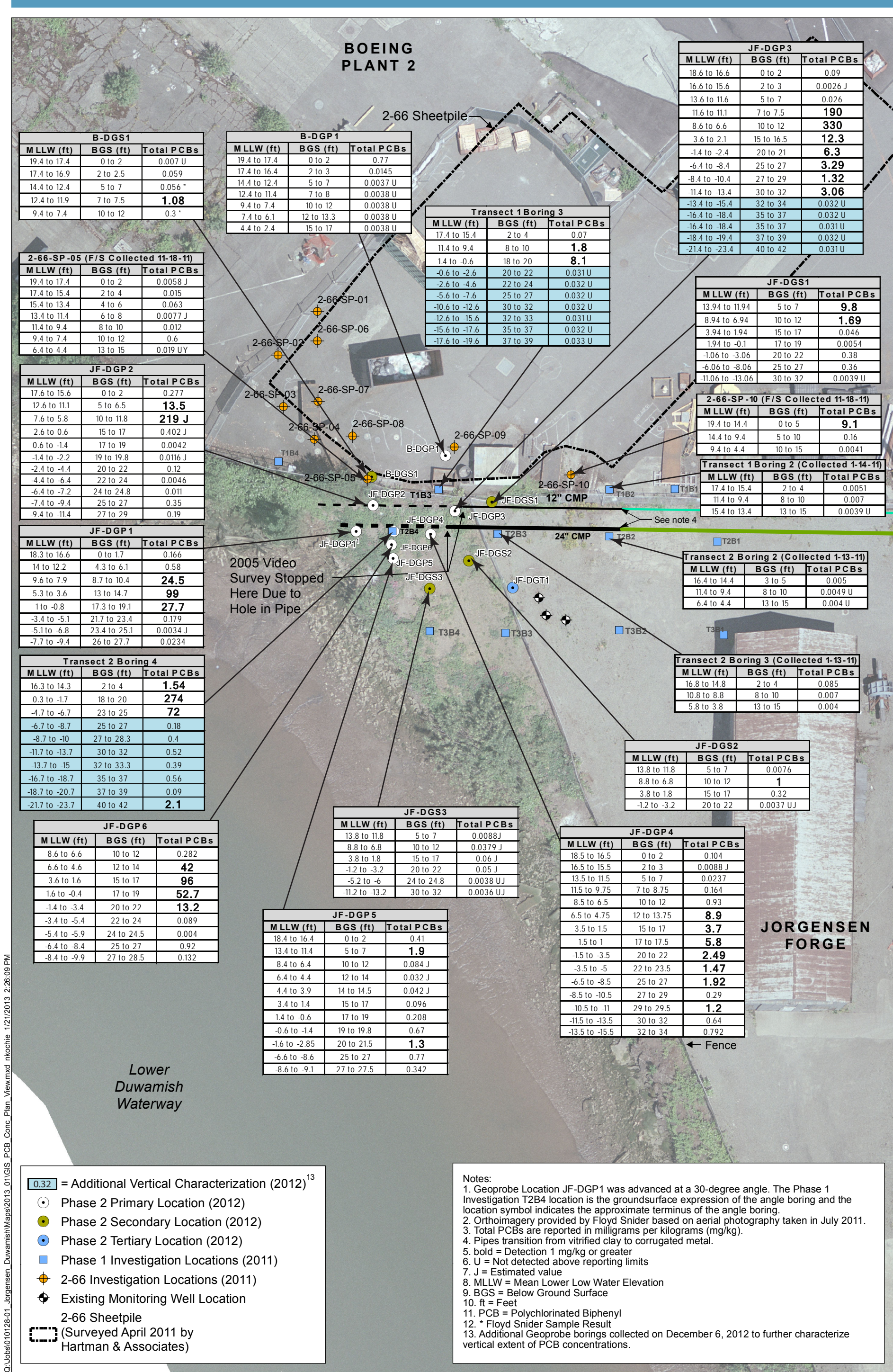
TCLP = toxicity characteristic leaching procedure

U = analyte was not detected above reporting limit

FIGURES



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Figure 2
Additional Geoprobe Vertical Characterization Results
December 2012
Phase 2 Work Plan Addendum
Jorgensen Forge Outfall Site

ATTACHMENT 1

WORK PLAN ADDENDUM FOR ADDITIONAL VERTICAL POLYCHLORINATED BIPHENYLS CHARACTERIZATION IN SOIL – JORGENSEN FORGE OUTFALL SITE

MEMORANDUM

To:	Aaron Lambert, EPA	Date:	December 5, 2012
From:	Ryan Barth, P.E., Anchor QEA Tom Colligan, L.H.G, Floyd Snider	Project:	0101218-04.01
For:	John Gross, Jorgensen Forge Corporation Will Ernst, The Boeing Company		
Cc:	Holly Arrigoni, EPA Maureen Sanchez, Ecology David Templeton, Anchor QEA		
Re:	Work Plan Addendum for Additional Vertical Polychlorinated Biphenyls Characterization in Soil – Jorgensen Forge Outfall Site		

This Work Plan Addendum (Addendum) has been prepared by Anchor QEA, LLC (Anchor QEA) and Floyd|Snider on behalf of the Jorgensen Forge Corporation (Jorgensen Forge) and The Boeing Company (Boeing) as part of the ongoing work being completed under the U.S. Environmental Protection Agency (EPA) Emergency Response Unit for the Jorgensen Forge Outfall Site (Outfall Site), located at 8531 East Marginal Way South in Seattle, Washington (Figure 1). Jorgensen Forge and Boeing previously performed a number of soil borings in the Outfall Site pursuant to the First Modification to the Administrative Order on Consent (Modified AOC; CERCLA Docket No. 10-2011-0017) and in accordance with the EPA-approved *Phase 2 Geoprobe Soil Investigation Work Plan* (Phase 2 Work Plan; Farallon and Anchor QEA 2012a). The results of the Phase 2 Investigation were summarized in the EPA-approved *Phase 2 Investigation Summary Report* (Anchor QEA and Farallon 2012b). This Addendum proposes the completion of three additional Geoprobe borings and soil sampling to complete documentation of the vertical extents of soils containing total polychlorinated biphenyls (PCBs) above 1 milligram per kilogram (mg/kg) dry weight within the Outfall Site.

Background

Pursuant to the 2011 EPA Administrative Order on Consent (AOC; CERCLA Docket No. 10-2011-0017) entered into by Jorgensen Forge and Boeing, in February 2011 Boeing and Jorgensen Forge completed the cleanout and closure of the clay sections of the 24-inch and

Boeing 12-inch property line storm pipes (herein referred to as the Pipes) that traverse the northern portion of the Jorgensen Forge property just south of the Boeing Plant 2 Facility property line. During completion of these remedial activities, Boeing completed 12 direct-push borings to a depth of 15 to 25 feet below ground surface (bgs) along three transects perpendicular to the shoreline to evaluate whether a release of hazardous substances occurred to subsurface soil beneath the corrugated metal section of the Pipes (Figure 1). These borings were a part of a larger investigation termed the Phase 1 Investigation. The Phase 1 Investigation was implemented in accordance with the *Source Control Action, 15-inch¹ and 24-inch Pipes Cleanout Work Plan* (Phase 1 Work Plan; Floyd|Snider 2010) and the results were summarized in the *Phase 1 Completion Report* (Floyd|Snider 2011).

Based on the results of the Phase 1 Investigation, Boeing and Jorgensen Forge, together with EPA, modified the AOC to require further investigation to assess the nature and extent of the elevated PCB concentrations in the soil in the vicinity of the Pipes and the collection of sufficient data to define any potential future removal action at the Outfall Site. To achieve the Modified AOC requirements, Jorgensen Forge and Boeing developed the Phase 2 Work Plan. The Phase 2 Work Plan proposed the completion of additional Geoprobe borings with a primary objective being to further characterize the lateral and vertical extents of total PCBs in soil exceeding 1 mg/kg, which is equivalent to the Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A, Unrestricted Land Use cleanup levels for PCBs, as established in Section 720 of Chapter 173-340 of the Washington Administrative Code (WAC) 173-340-720. The Phase 2 Investigation was conducted in late March 2012. The results of the Phase 2 Investigation were provided in the EPA-approved *Phase 2 Investigation Summary Report* (Anchor QEA and Farallon 2012b).

The total PCB soil concentrations identified during the Phase 1 and Phase 2 Investigations, as well as separate investigations conducted by Boeing on the Plant 2 property, are shown in Figure 2. This data documented the lateral extents of soils containing greater than 1 mg/kg total PCBs, but there are three locations (T1B3, JF-DGP3, and T2B4) where the deepest depth interval sampled contained total PCBs greater than 1 mg/kg.

¹ The 15-inch pipe refers to its outer diameter; the inner diameter was determined to be 12 inches during the performance of the Phase 1 Work Plan.

Objectives

Boeing and Jorgensen Forge are currently coordinating with EPA to develop a Second Modification to the AOC to remove the corrugated metal sections of the Pipes as well as underlying soils that contain greater than 1 mg/kg total PCBs. During coordination discussions with EPA and the Washington State Department of Ecology (Ecology), the agencies stated that the lack of vertical “bounding” data below 1 mg/kg total PCBs at the three locations could either be collected following the end of the removal action (e.g., confirmational samples) or prior to initiation of construction. EPA and Ecology have verbally agreed that, given the data density in the Outfall Site area, post-construction confirmation samples will not be required if the vertical extent is documented in these three locations and the removal action is designed to achieve the complete removal of soils greater than 1 mg/kg total PCBs. This Addendum is intended to fully comply with and document this verbal communication. To this end, the objectives of this Addendum are to complete three additional Geoprobe borings co-located at T1B3, JF-DGP3, and T2B4 (see Figure 2) in order to fully document the vertical extents of soil exceeding 1 mg/kg total PCBs at these locations in advance of detailed removal action design work. As a secondary objective, other analyses may be performed on samples collected to facilitate planning for the handling of waste soils generated during the removal action.

Sample Locations, Procedures, Laboratory Analysis, and Data Validation

The proposed Geoprobe sampling locations are shown on Figure 2. The Geoprobe sampling procedures, analysis, sample identification, and data validation will be identical to those in the EPA-approved Phase 2 Work Plan. Soil samples from the Geoprobe borings will be collected continuously in 5-foot segments, and subsampled in 2-foot intervals beginning in the 2-foot depth interval immediately below the deepest sampled soil depth containing soil concentrations exceeding 1 mg/kg total PCBs. Sampling will extend to 40 feet bgs at locations T1B3 and T2B4 and to 42 feet bgs at JF-DGP3. No samples will be collected at shallower depth intervals given that this portion of the soil column has already been sufficiently characterized. Sampling will extend deeper than the above described depth intervals as necessary to achieve the Addendum objectives.

All samples will be submitted for PCBs by EPA Method 8082 to Analytical Resources, Inc., which is the same laboratory that performed the Phase 2 Investigation PCB analyses. Volume permitting, additional soil volume from sampling intervals may be retained for potential future laboratory analysis (e.g., to facilitate planning for the handling of waste soils generated during the removal action).

Field Quality Assurance/Quality Control Samples

In accordance with the EPA-approved Phase 2 Work Plan, a field duplicate will be collected at a frequency of one sample for every 20 soil samples. The exact number of quality assurance/quality control (QA/QC) samples will depend on the number of soil samples collected. One equipment rinsate and field blank sample will be collected.

Decontamination and Waste Management

Decontamination and waste management procedures will be completed in accordance with the EPA-approved Phase 2 Work Plan.

Field Documentation

Field activities will be documented on Field Report forms, Log of Borings forms, Soil Sampling Data forms, Waste Inventory forms, Sample and Waste Material labels, and Chain of Custody forms in accordance with the EPA-approved Phase 2 Work Plan. Documentation generated during the field program will be retained in the project file and included in future design submittals and reports, as appropriate.

Quality Assurance Project Plan

The Addendum activities will be completed using the Quality Assurance Project Plan (QAPP) provided in the EPA-approved Phase 2 Work Plan, with the below described revisions.

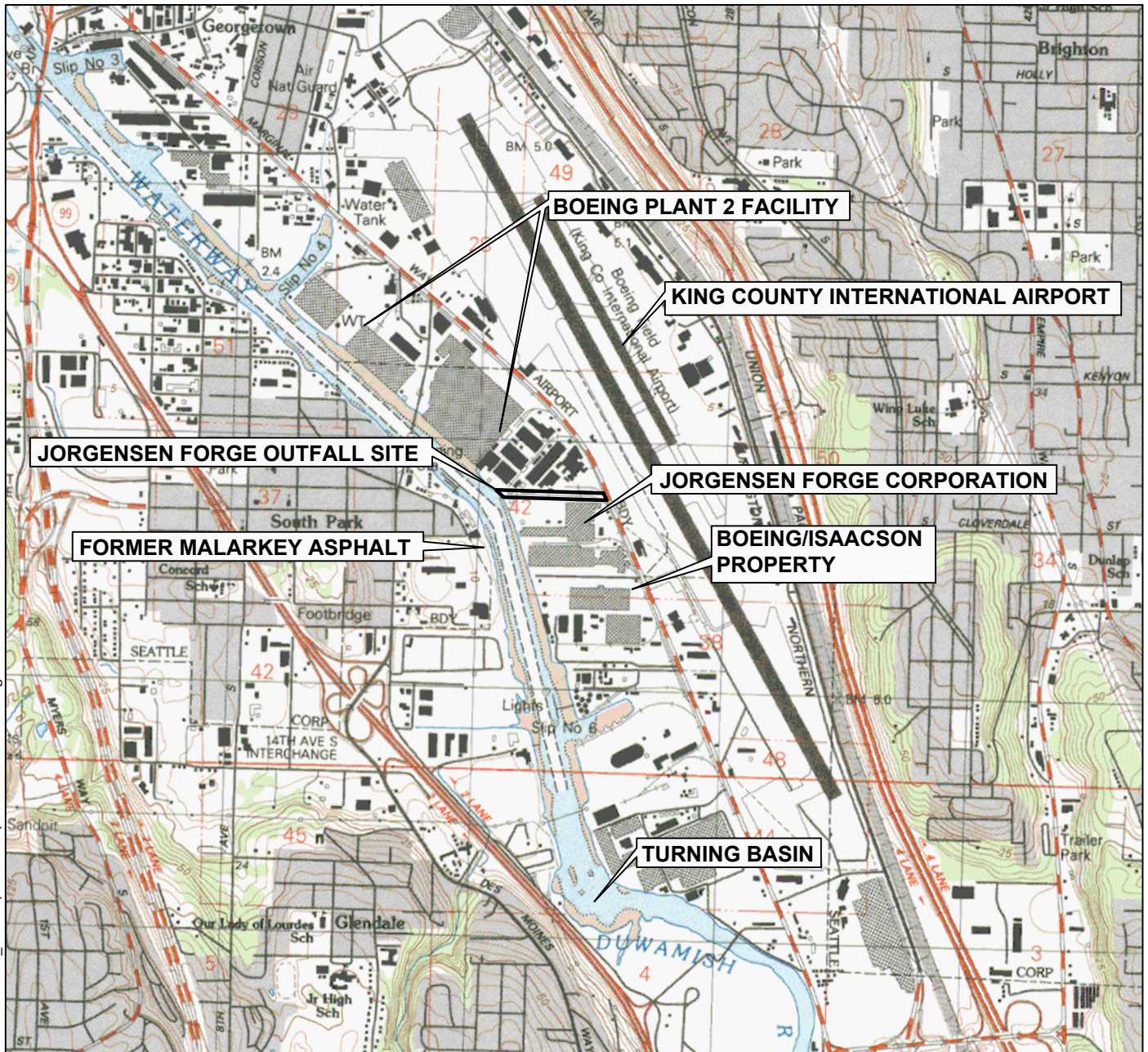
- QA/QC Officer – Nathan Soccorsy of Anchor QEA
- Regulatory Agency – Mr. Aaron Lambert is the EPA point of contact and control for matters concerning the Addendum
- Document Quality Control Clerk – Jonathan Bautista of Anchor QEA

Deliverables and Schedule

The results of the Addendum soil characterization will be incorporated into the design documents for the Outfall Site removal action currently in coordination between EPA, Boeing, and Jorgensen Forge. The design documents will include a short narrative describing the Addendum sampling activities, a figure showing the sampling locations, a table providing the analytical results of all collected media, and the data validation report(s).

Boeing and Jorgensen Forge are prepared to complete the Addendum activities expeditiously following EPA approval of this memorandum submittal. It is anticipated that the proposed work will take one to two days to complete followed by several weeks of laboratory analysis and data validation.

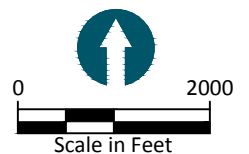
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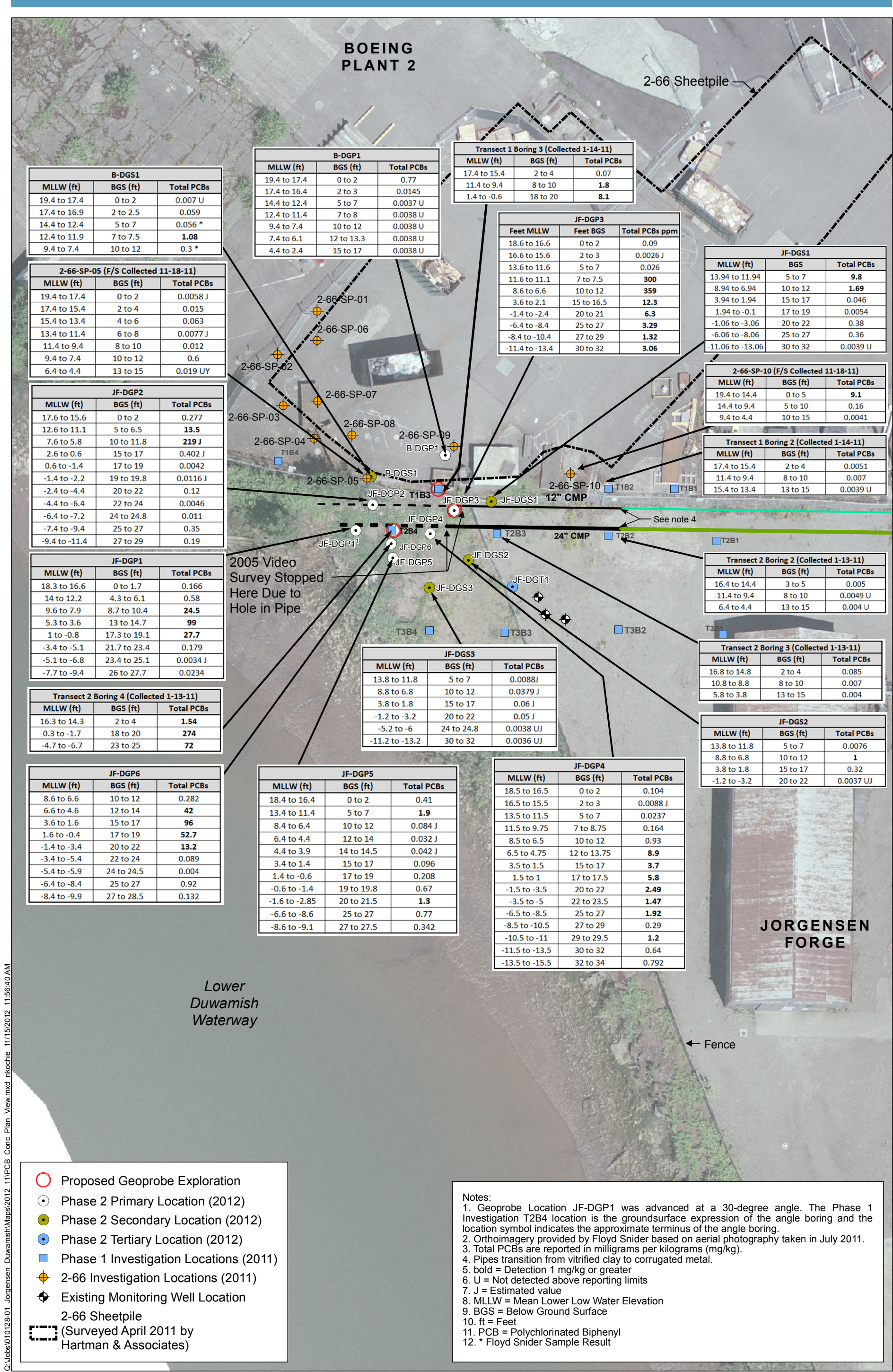


Not to Scale

SOURCE: Base map prepared from USGS 7.5 minute quadrangle map of Seattle South, WA, dated 1983.

NOTE: As defined in the Administrative Order on Consent, the Jorgensen Forge Outfall Site is a 24-inch outfall and an adjacent 15-inch outfall running along the northern boundary of the currently operating Jorgensen Forge facility.





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ATTACHMENT 2

BORING LOGS

Boring Location: JFDGP3			Boring JFDGP3 Date 12/6/2012 Sheet 1 of 1	
			Job JFOS	Job No. 010128-01.04
			Logged By NS/LG	Weather Rain
			Drilled By Cascade Drilling	
			Drill Type/ Method Geoprobe	
			Sampling Method	
			Bottom of Boring 50'	
PID	Sample Depth (feet)		Sample Recovery ¹	DESCRIPTION: Density, moisture, color, minor, MAJOR CONSTITUENT, non-soil substances: Odor, staining, sheen, slag, etc.
	From	To		
0.0	32	34	30 31 32 33 34	Medium stiff, moist, grey, fine to medium well-graded SAND with few fines, no odor, no sheen (Sample ID: JFDGP3-32-34-121206)
0.0	35	37	35 36	Medium stiff, moist, grey, fine to course well-graded SAND with few fines, no odor, no sheen (Sample IDs: JFDGP3-35-37-121206 and JFDGP3-37-39-121206)
0.0	37	39	37 38 39	
0.0	40	42	40 41 42 43 44	Medium stiff, moist, grey, fine to course well-graded SAND with few fines, no odor, no sheen (Sample ID: JFDGP3-40-42-121206)
			45 46	45 to 46 medium stiff, moist, grey, fine to medium silty SAND with few fines, no odor, no sheen with decomposing wood debris.
0.0	47	48.5	47 48 49 50	46 to 48.5 Medium stiff, moist, grey, fine to course well-graded SAND, no odor, no sheen (Sample ID: JFDGP3-47-48.5-121206; not analyzed)

Notes:

1. No soils were collected at this location from 0 to 30 feet below ground surface.

ATTACHMENT 3

DATA VALIDATION REPORT

DATA VALIDATION REVIEW REPORT – EPA STAGE 2A

Project: JFOS Vertical Characterization

Project Number: 010128-01.04

Date: January 15, 2013

This report summarizes the review of analytical results for 22 soil samples, one field duplicate, one rinse blank, and one field blank collected December 6, 2012. The samples were collected by Floyd Snider, Inc. and Anchor QEA, LLC, and submitted to Analytical Resources, Inc. (ARI) in Tukwila, Washington. The samples were analyzed for the following parameters:

- Aroclor polychlorinated biphenyls (PCBs) by U.S. Environmental Protection Agency (USEPA) method 8082
- Toxic characteristic leaching procedure (TCLP) metals by USEPA methods 1311 6010C and 7471A

ARI sample data group (SDG) numbers VV44 and VX69 were reviewed in this report. Samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Lab ID	Matrix	Analyses Requested
T1B3-18-20-121206	VV44A	Soil	TCLP metals
T1B3-20-22-121206	VV44B	Soil	PCBs
T1B3-22-24-121206	VV44C	Soil	PCBs
T1B3-25-27-121206	VV44D	Soil	PCBs
T1B3-30-32-121206	VV44E	Soil	PCBs
T1B3-32-33-121206	VV44F	Soil	PCBs
T1B3-35-37-121206	VV44G	Soil	PCBs
T1B3-37-39-121206	VV44H	Soil	PCBs
JFDGP3-32-34-121206	VV44I	Soil	PCBs
JFDGP3-35-37-121206	VV44J	Soil	PCBs
JFDGP3-35-37-121206-DUP	VV44K	Soil	PCBs
JFDGP3-37-39-121206	VV44L	Soil	PCBs
JFDGP3-40-42-121206	VV44M	Soil	PCBs

Sample ID	Lab ID	Matrix	Analyses Requested
JFDGP3-47-48.5-121206	VV44N	Soil	PCBs
T2B4-15-20-121206	VV44O	Soil	TCLP metals
T2B4-23-24.5-121206	VV44P	Soil	TCLP metals
T2B4-25-27-121206	VV44Q	Soil	PCBs
T2B4-27-28.3-121206	VV44R	Soil	PCBs
T2B4-30-32-121206	VV44S	Soil	PCBs
T2B4-32-33.3-121206	VV44T	Soil	PCBs
T2B4-35-37-121206	VV44U	Soil	PCBs
T2B4-37-39-121206	VV44V	Soil	PCBs
T2B4-40-42-121206	VV44W/VX69A	Soil	PCBs
JFOS-RB-121206	VV44X	Water	PCBs
JFOS-FB-121206	VV44Y	Water	PCBs

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective sections of the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP). Laboratory results were reviewed using the following guidelines:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999)
- *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2008)

Laboratory and method QC criteria were also used as stated in USEPA 1986 (SW-846, Third Edition), *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, update 1, August 1993; update II, January 1995; update IIA, February 1994; update IIB, August 1995; update III, June 1997; update IIIA, May 1999; update IIIB, June 2008; update IVA and IVB, January 2008. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody forms were signed by ARI at the time of sample receipt; the samples were received cold and in good condition.

Holding Times and Sample Preservation and Analytical Methods

Samples were appropriately preserved and analyzed within holding times.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes

Field Quality Control***Rinse and Field Blanks***

One rinse blank and one field blank were collected in association with these sample sets and were free of target analytes.

Field Duplicates

One field duplicate was collected with this sample set. No target analytes were detected in the sample or duplicate.

Surrogate Recoveries

All surrogate recoveries were within the laboratory control limits.

Column Confirmation

Detected PCB results met second column confirmation requirements.

Laboratory Control Sample and Laboratory Control Sample Duplicate

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed at the required frequency. All LCS/LCSD recoveries and/or relative percent difference (RPD) values were within laboratory control limits.

Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were not analyzed in association with the PCB analyses. A MS was analyzed in association with the metals analyses and recovered within laboratory control limits.

Laboratory Replicates

Laboratory replicates were analyzed at the required frequency and all results were within required limits.

Sample Analyses

Due to an unexpected PCB result, sample T2B4-40-42-121206 was re-extracted and reanalyzed. Results from both analyses were similar. The result should be reported from the original analysis.

Method Reporting Limits

Reporting limits were deemed acceptable as reported. All values were reported using the laboratory reporting limits. Values were reported as undiluted, or when reported as diluted, the reporting limit accurately reflects the dilution factor. Some PCB reporting limits were elevated due to chromatographic interference.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable as demonstrated by the surrogate, LCS/LCSD, and MS recoveries. Precision was also acceptable as demonstrated by the laboratory duplicates and LCS/LCSD RPD values. All data were acceptable as reported. Where two sets of results were reported for one sample, the least technically acceptable results were flagged as not reportable. Those results are summarized in Table 2.

Data Qualifier Definitions

- U Indicates the compound or analyte was analyzed for but not detected at or above the specified limit.
 - J Indicates an estimated value.
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- R Indicates data is rejected and unusable
- UJ Indicates the compound or analyte was analyzed for but not detected and the specified limit reported is estimated
- DNR Do not report

Table 2
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
T2B4-40-42-121206	PCBs	Aroclor 1016	310U µg/kg	DNR	Report from initial analysis
		Aroclor 1242	310U µg/kg		
		Aroclor 1248	310U µg/kg		
		Aroclor 1254	2100 µg/kg		
		Aroclor 1260	310U µg/kg		
		Aroclor 1221	310U µg/kg		
		Aroclor 1232	310U µg/kg		
		Aroclor 1262	310U µg/kg		
		Aroclor 1268	310U µg/kg		

REFERENCES

- USEPA (U.S. Environmental Protection Agency), 1986. Test methods for Evaluating Solid Waste: Physical/Chemical Methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA 530/SW-846.
- USEPA, 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October.
- USEPA, 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. USEPA 540/R-99/008. October.
- USEPA, 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. USEPA 540-R-08-01. June.